

REMARKS

This is in response to the Office Action mailed June 8, 2005. Reconsideration of this application in view of the following remarks is respectfully requested.

Status of the Claims

Claims 1-24 are pending. Claims 1-24 have been amended to conform to U.S. patent practice, to more particularly recite the claimed subject matter and to provide proper antecedent basis. Support for these amendments is found in the original claims as filed and throughout the specification, particularly at page 3, line 14 to page 5, line 21. No new matter has been added by way of these amendments.

Rejection under 35 U.S.C. § 103(a)

Claims 1-24 have been rejected under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 5,689,010 ("Paciello") and U.S. Patent No. 4,408,079 ("Merger"). Specifically, the Examiner contends that, although Paciello does not expressly disclose a biphasic system for simultaneous hydroformylation and aldol condensation reactions, the reference teaches a higher alcohol solvent. The Examiner argues that it would have been obvious to a person of ordinary skill that the higher alcohol solvent is employed in Paciello to create a biphasic system in which hydroformylation and aldol condensation occur simultaneously without adverse effects on the catalysts. The Examiner further contends that Merger teaches a process for the preparation of α -acroleins by aldol condensation of an alkanal with formaldehyde, and that although Paciello does not teach a "cross-aldol" condensation of an aldehyde formed from a hydroformylation reaction with formaldehyde, one skilled in the art would have modified the process taught by Paciello to include the "cross-aldol" condensation of an alkanal and formaldehyde disclosed in Merger. Applicants respectfully

traverse this rejection and submit that the cited prior art, taken alone or in combination, does not render the claimed process obvious.

Applicants submit that the process of the instant invention is a “one-pot preparation” of α -substituted acroleins wherein the hydroformylation and aldol condensation reactions are conducted simultaneously. *See e.g.*, specification, page 11, lines 8-12; claims 1 and 23. The process requires a biphasic solvent system to insure segregation of the incompatible hydroformylation and aldolisation catalysts. *See e.g.*, specification, page 11, lines 4-7; claims 1-3, 6, 9-10, 14, 15 and 22. Furthermore, the process of the instant invention favors a “cross-aldol” reaction between the oxo-aldehyde formed in the hydroformylation reaction and formaldehyde by segregating the aldol condensation in the aqueous phase that contains formaldehyde. *See e.g.*, specification, page 11, lines 19-21; claims 1, 9-10 and 15.

Paciello does not teach or suggest the use of a biphasic system for simultaneous hydroformylation and aldol condensation reactions required by the presently claimed process. Paciello does not disclose the use of water in its reaction mixtures, but discloses only non-aqueous solvents such as higher alcohols, aldehydes produced by the reaction of the olefin starting materials or “high boilers produced by subsequent reactions of the particular aldehyde in the process.” *See* Paciello, col. 3, lines 26-32. Thus, contrary to the Examiner’s contentions, the use of a higher alcohol solvent in Paciello’s process renders the reaction mixture homogeneous, and does not create a biphasic system because no aqueous solvent is present in the reaction mixture to create a second immiscible phase. Applicants further contend that even if a second immiscible phase were present in the reaction mixtures of Paciello, its presence would not necessarily create a biphasic system. Rather, formation of a biphasic system is dependent on the solvent properties, reactivities and

solubilities of the solvents used. Paciello does not teach or suggest the solvent properties, reactivities or solubilities required to form a biphasic system for simultaneous hydroformylation and aldol condensation reactions.

Applicants further submit that it would not have been obvious to combine the teachings of Paciello with the “cross-aldol” condensation of Merger to achieve the process of the present invention. In the instant process, a “cross-aldol” reaction between an oxo-aldehyde formed by hydroformylation and formaldehyde is insured by controlling the relative concentrations of the oxo-aldehyde and formaldehyde in the reaction mixture. *See* specification at page 7, lines 4-8. This control is achieved in the instant invention by having a proper biphasic system such that the oxo-aldehyde formed in the organic phase partitions into the aqueous phase where it cross-reacts with formaldehyde. *See* specification, page 5, lines 23-29; page 9, lines 5-22; page 11, lines 19-21. Neither Paciello nor Merger alone or in combination teaches or suggests the process of the present invention whereby a “cross-aldol” reaction is achieved by controlling the mole ratio of olefin to formaldehyde using a biphasic solvent system.

In summary, neither of the references cited or relied upon by the Examiner teaches or suggests the process of preparing α -substituted acroleins by simultaneous hydroformylation and cross-aldol condensation with formaldehyde in a biphasic solvent system as set forth in claim 1. Accordingly, Applicants submit that the cited references do not teach each and every limitation of the claimed invention. *Brown & Williamson Tobacco Corp. v. Philip Morris Inc.*, 229 F.3d 1120, 1124-25, 56 USPQ2d 1456, 1459 (Fed. Cir. 2000) (internal citations omitted); *see also* MPEP § 2142. Further, the cited references do not render obvious the claimed process because the references, taken in any combination, do not give rise to any suggestion or motivation to combine or

modify the references or that such a combination would be successful. In view of the above arguments, reconsideration of the application is respectfully requested.

Conclusion

In view of the above amendments and remarks, it is respectfully requested that the application be reconsidered and that all pending claims be allowed and the case passed to issue.

Dated: September 7, 2005

Respectfully submitted,

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